Claims

1. A method of managing time for a controller located in a processing system on a

5   machine, the processing system including a plurality of controllers, each controller having a local clock, and a communication network connecting each of the controllers, including the steps of:

10   establishing an operating characteristic of the machine;

determining whether to update a local time in response to said operating characteristic; and

updating said local time using the local

15   clock in response to said update determination.

2. A method, as set forth in claim 1, further comprising the steps of:

20   receiving an official time;

determining a difference between said official time and said local time; and,

determining whether to synchronize said local time with said official time in response to said

25   time difference.

3. A method, as set forth in claim 2, wherein the step of establishing said operating characteristic further comprises the step of receiving

30   an operating characteristic, said operating

characteristic being indicative of the machine being operated.

4. A method, as set forth in claim 2, wherein the step of establishing said operating characteristic further comprises the step of receiving an operating characteristic, said operating characteristic being indicative of the engine being operated.

5. A method, as set forth in claim 2, wherein the step of determining whether to synchronize said local time further comprises the step of determining to synchronize said local time with said official time in response to said time difference being greater than a first threshold.

6. A method, as set forth in claim 5, further comprising the step of establishing a master controller of the processing system.

7. A method, as set forth in claim 6, wherein the step of receiving said official time further comprises the step of receiving said official time from said master controller.

8. A method, as set forth in claim 7, wherein the step of establishing said operating characteristic further comprises the step of receiving

an operating characteristic signal from said master
controller.

     9. A method, as set forth in claim 6,
5   wherein the step of establishing said master
controller further comprises the step of participating
in an <u>arbitration</u> process among the controllers.

     10. A method, as set forth in claim 9,
10   further comprising the step of receiving an
arbitration signal.

     11. A method, as set forth in claim 10,
generating a priority signal in response to receiving
15   said arbitration signal, said priority signal being
indicative of at least one controller characteristic.

     12. A method, as set forth in claim 11,
further comprising the steps of:

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     receiving at least one priority signal;
     determining whether to become the master
controller in response to said received at least one
priority signal.

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     13. A method, as set forth in claim 10,
further comprising the step of initiating said
arbitration process in response to receiving power.

14. A method, as set forth in claim 10, wherein the step of initiating said arbitration further comprises the step of initiating said arbitration process in response to failing to receive

5   one of said official time and said operating characteristic.

15. An apparatus configured to manage time on a processing system located on a machine,

10   comprising:

    a plurality of controllers;

    a local clock located on each controller and configured to establish a local time;

15   a communication network connected to said controllers; and

    wherein each of said plurality of controllers is configured to establish an operating characteristic of the machine, determine whether to

20   update said local time, using said local clock, in response to said operating characteristic, and updating said local time in response to said update determination.

25   16. An apparatus, as set forth in claim 15, wherein said plurality of controllers being further adapted to establish a master controller in response to an arbitration process, the remaining controllers being non-master controllers.

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17. An apparatus, as set forth in claim 16, wherein each of said non-master controllers receives an official time signal from said master controller.

5   18. An apparatus, as set forth in claim 17, wherein each of said non-master controllers is further adapted to determine a difference between said official time and said local time and determine whether to synchronize said local time with said

10   official time in response to said time difference.

19. An apparatus, as set forth in claim 18, wherein each of said non-master controllers receives an operating characteristic signal, indicative of said

15   operating characteristic, from said master controller.

20. An apparatus, as set forth in claim 19, wherein said operating characteristic is indicative of at least one of a machine operation and an engine

20   operation.

21. An apparatus, as set forth in claim 20, wherein each of said non-master controllers is further adapted to synchronize said local time with said

25   official time in response to said difference being greater than a first threshold.

22. An apparatus, as set forth in claim 21, wherein at least one of said non-master controllers

30   initiates said arbitration in response to failing to

receive one of said official time signal and said operating characteristic signal.

23. An apparatus, as set forth in claim 22, wherein each said non-master controller generates a priority signal indicative of said controllers capability.

24. An apparatus, as set forth in claim 23, wherein each said non-master controller is further adapted to determine whether to be the master controller in response to receiving said priority signals.

25. A method of managing time for a processing system located on a machine, the processing system including a plurality of controllers, each controller having a local clock, and a communication network connecting each of the controllers, including the steps of:

establishing an operating characteristic of the machine;

determining whether to update a local time on each of the controllers in response to said operating characteristic; and

updating said local time, using the local clock, in response to said update determination.

26. A method, as set forth in claim 25, further comprising the steps of:

establishing an official time;
5   determining a difference between said official time and said local time; and,
determining whether to synchronize said local time with said official time in response to said time difference.
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27. A method, as set forth in claim 26, further comprising the step of establishing a master controller, the other controllers being non-master controllers.
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28. A method, as set forth in claim 27, wherein the step of establishing said operating characteristic further comprises the step of delivering an operating characteristic to each of the
20   non-master controllers, said operating characteristic being indicative of the machine being operated.

29. A method, as set forth in claim 27, wherein the step of establishing said operating
25   characteristic further comprises the step of delivering an operating characteristic signal to each of the non-master controllers, said operating characteristic being indicative of the engine being operated.
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30. A method, as set forth in claim 27, wherein the step of determining whether to synchronize said local time further comprises the step of synchronizing said local time with said official time

5 in response to said time difference being greater than a first threshold.

31. A method, as set forth in claim 30, wherein the step of receiving said official time

10 further comprises the step of receiving said official time from said master controller.

32. A method, as set forth in claim 31, wherein the step of establishing said operating

15 characteristic further comprises the step of receiving an operating characteristic signal from said master controller.

33. A method, as set forth in claim 32,

20 wherein the step of establishing said master controller further comprises the step of arbitrating among the controllers.

34. A method, as set forth in claim 33,

25 wherein the step of arbitrating further comprises the steps of:

at least one of the controllers initiating said arbitration; and

said at least one controller generating an

30 arbitration signal in response to said intitiation.

IS THIS WORD EXTRANEOUS

35. A method, as set forth in claim 34, further comprising the step of generating a priority signal in response to receiving said arbitration

5   signal, said priority signal being indicative of at least one controller characteristic.

36. A method, as set forth in claim 35, further comprising the steps of:

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receiving said priority signals;
determining whether to become the master controller in response to said received priority signals.

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37. A method, as set forth in claim 36, wherein the step of initiating said arbitration further comprises the step of initiating said arbitration process in response to receiving power.

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38. A method, as set forth in claim 37, wherein the step of initiating said arbitration further comprises the step of initiating said arbitration process in response to failing to receive

25   one of said official time and said operating characteristic.